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| 10/559,710 | 12/07/2005 | Sebastian Kanne | R.305558 | 1888 |

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| EXAMINER | |
|---|---|
| MCGRAW, TREVOR EDWIN | |
| **ART UNIT** | **PAPER NUMBER** |
| 3752 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

ED

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/559,710 | KANNE ET AL. | |
| | Examiner | Art Unit | |
| | Trevor McGraw | 3752 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *10, 11, 16-20 and 24-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10,11,16-20 and 24-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

The amendment filed 03/28/2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The added subject matter in paragraphs 25 and 28 as noted on pages 2 and 3 in Applicant's Remarks under the AMENDMENTS TO THE SPECIFICATION heading.

Applicant is required to cancel the new matter in the reply to this Office Action.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 28 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 5 of Claims 28 and 29, it is unclear to Examiner as to what the recitation "on the other" is referring to within the Claim limitations.

Appropriate clarification of the aforementioned issues is solicited from Applicant.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10, 11, 16-20 and 24-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Kappel et al. (DE 4306073).

In regard to Claims 10, 11, 16-20 and 24-29, Kappel et al. (DE 4,306,073) teaches an injector for fuel injector systems of internal combustion engines, in particular direct injection diesel engines, where the injector has a piezoelectric actuator (P) located in an injector body (GH) and is held in contact with the injector body (GH) on one side (Figure 1) and has a sleeve like booster piston (DK) having an inner chamber (KA2), a nozzle body which is joined to the injector body (GH) and has at least one nozzle outlet opening (EO), a stepped nozzle needle (VN) that is guided axially displaceable in the nozzle body (VK) and a second spring (RF) is disposed inside the booster piston (DK) where the second spring (RF) with the injection pressure acting on the back side of the nozzle needle (VN) keep the nozzle needle in the closing position and a control chamber (KA1) is embodied on the end toward the nozzle needle (VN) of the booster piston (DK) and communicates with at least one leakage gap (KS1, KS2) where the leakage gaps (KS1, KS2) have hydraulic communication between the inner chamber (KA2) of the booster piston (DK) at injection pressure and with a fuel supply (SP) that is also at injection pressure, the nozzle needle (VN) is guided in the inner chamber (KA2)

of the booster piston and is urged in the opening direction by the fuel located in the control chamber (KA2) where the booster piston (DK) is actuated by the piezoelectric actuator is spatially or spaced directly with the nozzle needle (VN) so that the nozzle needle (VN) is fitted with a rear region (HK) that has a larger diameter than a region of the nozzle needle (VN) toward the nozzle outlet (EO) into the inner chamber (KA2) of the booster piston (DK). The diesel fuel injector of Kappel et al. also teaches where the nozzle body (VK) adjoins the injector body (GH) on the face end in the flow direction and the piezoelectric actuator (P) extends as far as the end toward the nozzle body (VK) of the injector body (GH) where the piezoelectric actuator (P) is centered in an axially cylindrical recess (LA) of the injector body (GH) in such a way that an annular chamber is created between the outer wall of the piezoelectric actuator (P) and the inner wall of the cylindrical recess of the injector body (GH) where the annular chamber communicates hydraulically directly with the fuel supply (SP) that is at injection pressure and the annular chamber (Figure 9) extends into the region of the booster piston (KA3) axially adjoining the piezoelectric actuator (P) and where the inner chamber (KA2) of the booster piston (DK) communicates hydraulically with the annular chamber and the fuel supply (SP) and the pressure booster (DK) is guided in the nozzle body (VK) with a leakage gap that is created between the annular chamber and the control chamber at injection pressure.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10, 16, 17, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kappel et al. (DE 4,306,073) in view of Bart (US 4,022,166) and further in view of Fuessner (DE 3,519,945).

In regard to Claims 10, 16 and 17, Kappel et al. (DE 4,306,073) for at least the aforementioned reasons as described and taught above discloses the claimed invention except for a compression spring concentrically surrounding the booster piston located in a lower region of the annular chamber associated with the booster piston where the compression spring is braced toward the piezoelectric actuator on a collar of the booster piston and toward the nozzle outlet on a rear end face of the nozzle body so the piezoelectric actuator and the booster piston are kept in contact with one anther by non-positive engagement. Bart (US 4,022,166) teaches that it is known to have a compression spring concentrically surrounding a booster piston located in a lower region of an annular chamber associated with a booster piston where the compression spring is braced toward the piezoelectric actuator on a collar of the booster piston and toward the nozzle outlet on a rear end face of the nozzle body so the piezoelectric actuator and booster piston are kept in contact with one another by non-positive engagement (Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Kappel et al. with the concentric spring, booster piston, collar and piezoelectric actuator arrangement of Bart (US 4,022,166) in order to provide a means for keeping the piezoelectric actuator out of

positive engagement with the booster piston to avoid undesired electrical conductivity between the metallic booster piston and piezoelectric actuator which prevents material fatigue over an extended period of time due to electrical embrittlement of the metallic booster piston which ultimately affects the components performance.

In regard to Claims 10, 28 and 29, Kappel et al. (DE 4,306,073) for at least the aforementioned reasons as described and taught above discloses the claimed invention except for a union nut securing the nozzle body to the injector body and a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via recesses machined into the nozzle body on one side with the annular chamber and on the other with the cylindrical pressure chamber. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the nozzle body and the injector body of the present invention separate and connected with a union nut in such a manner to create a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via recesses machined in the nozzle body on one side with the annular chamber and on the other with the cylindrical pressure chamber, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman, 168 USPQ 177, 179.* It is also of note to Applicant that it is old and well known in the art to have a union nut that secures the nozzle body of a fuel injector to the injector body of a fuel injector where a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via

recesses machined into the nozzle body on one side of the annular chamber and on the other with the cylindrical pressure chamber as taught by Fuessner (DE 3,518,945) making the Claims (emphasis on Claims 10, 28 and 29) of the present invention obvious over Kappel et al. (DE 4,306,073) in view of Fuessner (DE 3,518,945) .

***Response to Arguments***

**Rejection under 35 USC § 112**

Examiner withdraws the rejection to Claim 10 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "on the other via" from line 4 of Claim 10.

Examiner withdraws the rejection to Claim 10 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "on the back side of" from line 8 of Claim 10.

Examiner withdraws the rejection to Claim 10 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that makes proper reference to the limitation "the injection pressure" thus ensuring proper Claim antecedence in line 8 of Claim 10.

Examiner withdraws the rejection to Claim 11 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "(lower) end" and adds "face end" as a limitation in line 3 of Claim 11.

Examiner withdraws the rejection to Claims 12 and 13 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that cancels Claims 12 and 13.

Examiner withdraws the rejection to Claims 16 and 17 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "(lower)" in line 2 of Claims 16 and 17.

Examiner withdraws the rejection to Claims 16 and 17 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "(upper)" in line 5 of Claims 16 and 17.

Examiner withdraws the rejection to Claims 18, 19 and 20 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "(high pressure)" in line 4 of Claims 18, 19 and 20.

Examiner withdraws the rejection to Claims 21, 22 and 23 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that cancels Claims 21, 22 and 23.

Examiner withdraws the rejection to Claims 24, 25 and 26 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "(high pressure)" in lines 4 and 7 of Claims 24, 25 and 26.

Examiner withdraws the rejection to Claims 27, 28 and 29 held under 35 U.S.C. § 112 Second Paragraph in view of Applicant's amendment that deletes the terminology "(clamping nut)" in line 1 of Claims 27, 28 and 29.

Examiner maintains rejection to Claims 28 and 29 held under 35 U.S.C. § 112 Second Paragraph as Applicant has not amended the claims to make clear as to what the limitations "on the other" is referencing. Furthermore, Applicant has not addressed

and has essentially ignored Examiner's concerns brought forth regarding Claims 28 and 29 in the remarks filed 03/28/2007.

**Rejection under 35 USC § 102**

Applicant's arguments filed 03/28/2007 have been fully considered but they are not persuasive. Applicant's assertion that the Kappel et al. reference does not teach a piezoelectric actuator being centered in an annular chamber is unfounded. It can be clearly shown from the Kappel et al. reference that a piezoelectric element actuator (P) is clearly centered within an annular chamber in Figure 1. Applicant has brought forth no evidence of the piezoelectric element of Kappel et al. not being centered within an annular chamber. Applicant also asserts that the chamber (KA3) is not maintained at a fuel injection pressure and is not supplied by fuel at an injection pressure is unfounded. Kappel et al. is supplied by fuel from a fuel supply and fuel enters chamber (KA3) and is pressurized by the fuel entering the fuel injector. To the extent that fuel enters the fuel injector, the fuel pressure is at least at fuel injection pressure as the chamber (KA3) of Kappel et al. communicates with the other chambers KA1, KA2 via the leakage gaps KS1, KS2 as can be clearly seen in Figure 3. It is also noted to Applicant that chamber KA2 is the inner chamber of the pressure booster piston and that pressure is increased within KA2 thus increasing the pressure for spraying out of the opening (EO) and is subjected to at least fuel injection pressure.

**Rejection under 35 USC § 103**

Applicant's arguments filed 03/28/2007 have been fully considered but they are not persuasive. Applicant's arguments do not follow with the rejection mailed in Office Action correspondence on 12/28/2006. As best understood from Applicant's arguments and in view of Applicant's amendment, the combined references used in the 35 U.S.C. § 103 (a) rejection are proper. Additionally, Applicant has not amended the Claims in such a manner to overcome the rejection to Claims 16, 17, 28 and 29. Thus, Examiner maintains the rejection of Claims 16, 17, 28 and 29 held under 35 U.S.C. § 103 (a).

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trevor McGraw whose telephone number is (571) 272-7375. The examiner can normally be reached on Monday-Friday (2nd & 4th Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Shaver can be reached on (571) 272-4720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Trevor McGraw
Art Unit 3752

TEM

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